



Underwater Investigations & Archaeology
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Re: Executive Summary
Phase I Underwater Archaeological Project
Fenwick Island Channel Dredging Project
Little Assawoman Bay
Fenwick Island, Sussex County, Delaware

Dear Mr. Bagnall:

This letter is to confirm the successful completion of all fieldwork for the Phase I Underwater Archaeological remote sensing survey in Little Assawoman Bay. The Town of Fenwick Island, Delaware is pursuing the completion of a hydraulic dredging project to address navigational hazards in two channels (North and South) of Little Assawoman Bay. The combined channel is approximately 4,000 linear feet, and the two channels cover a combined surface area of approximately 4.6 acres. The U.S. Army Corps of Engineers (Philadelphia District) and the Delaware Historic Preservation Office has indicated that the proposed project has the potential to impact submerged cultural resources. Therefore, a comprehensive remote sensing investigation was conducted within the North and South Channel survey areas to assess the presence or absence of potentially significant remote sensing target signatures that are suggestive submerged cultural resources. The South Channel survey area also included a short section that extended to the south near the approximately middle of the area (Figure 1).

The Phase I Underwater Archaeological Project included background documentary research, acoustic, and magnetic remote sensing to determine the presence or absence of submerged cultural resources potentially eligible for the National Register of Historic Places that might be affected by the proposed dredging project. The underwater archaeological investigation will assist in compliance with: Section 106 of the National Historic Preservation Act of 1966, as amended; the regulations of the Advisory Council on Historic Preservation (30 CFR Part 800); the National Environmental Policy Act of 1969, as amended; other applicable federal and state mandates; and Corps of Engineers regulations (33 CFR Part 325, Appendix C). This investigation was conducted in accordance with the instructions and intents of the Secretary of the Interior's Standards and Guidelines for Archaeology and Historic Preservation (48 FR 44716) and Guidelines for Architectural and Archaeological Surveys in Delaware (1993).

A Work Plan outlining the fieldwork operations was submitted on October 26, 2021. The Phase I underwater archaeological investigations as detailed in the Work Plan were designed to assess the number, locations, cultural affiliations, components, spatial distribution, data potential, and other salient characteristics of potential submerged cultural resources within the two survey areas. Results from the

remote sensing surveys were then evaluated according to a background historical framework to determine the likelihood and type of potentially significant submerged archaeological resources located in these two portions of Little Assawoman Bay.

All remote sensing fieldwork was completed during a high-tide cycle on the afternoon of November 11, 2021. The magnetic and acoustic remote sensing fieldwork was carried out from a 22-foot fiberglass survey vessel suitable for shoal water operations. A *Geometrics*, G-881, cesium magnetometer, capable of +/- 1/10 gamma resolution, was employed to collect magnetic remote sensing data. The sensor for the magnetometer was outfitted with a float and towed behind 40 feet the survey vessel to ensure optimum magnetic data collection in the extremely shallow water conditions. A 1/10 -second sampling rate by the magnetometer's sensor, coupled with a four-knot vessel speed, assured a magnetic sample every 0.5 feet.

A *Marine Sonic HDS* two channel acoustic recorder with a dual 600/1200 kHz side scan sensor was used to gather side scan sonar data. The sonar sensor was towed just under the water surface from the bow of a survey boat due to the shallow water conditions in Little Assawoman Bay. The side scan sonar was operated with a swath coverage of 50-feet per channel which provided significantly overlapping acoustic coverage of the two survey areas.

Survey vessel track line control and position fixing were obtained by using a laptop PC-based software (*Hypack*) package in conjunction with a *Hemisphere* Differential Global Positioning System (DGPS) onboard the survey vessel. Positioning data from the DGPS were converted by the computer to Delaware NAD 83 X,Y coordinates in real time. These X,Y coordinates were used to guide the survey vessel precisely along predetermined track lines that were established at 25-foot offsets in the two channel project survey areas. While surveying, vessel positions were continually updated on the computer monitor to assist the vessel operator, and the processed X,Y data were continually logged on computer disk for post processing and plotting. All remote sensing equipment offsets were also interfaced with the navigational computer. Post-processing of the two data sets commenced once all survey lanes in the two project areas were completed. All survey data and findings will be presented in Delaware State Plane coordinates, in feet.

Data Processing

Analysis of magnetic signatures identified during the survey was based on several criteria. Magnetometer data were contour plotted at five-gamma intervals and each anomaly was analyzed according to: magnetic intensity (total distortion of the magnetic background measured in gammas); pulse duration (detectable signature duration); signature characteristics (negative monopolar, positive monopolar, dipolar, or multi-component); and spatial extent (total area of disturbance).

Sonar records were inspected for potential man-made features present on the bottom surface and a sonar mosaic was created for both the North Channel and South Project areas. Individual sonar targets were analyzed according to their spatial extent, configuration, location, and environmental context. Magnetic records were then correlated with the acoustic targets to provide any further information on the identity of the material generating the remote sensing signatures. Potentially significant targets will then be recommended for further investigation or avoidance.

Both the North Channel and South Channel survey areas were very shallow. These shallow water conditions magnify typical magnetic readings due to the proximity of the sensor to surface of the bay bottom. The shallow water also restricted the typical range settings used with the side scan sonar unit, however the 100-foot swath coverage during each lane provided significant overlapping acoustic coverage of both areas. The presence of submerged aquatic vegetation (SAV) was also noted on the sonar records in both survey areas.

Findings

Although preparation of the Draft Report and limited maritime historical research is ongoing, preliminary inspection of the remote sensing data has identified the presence of several relatively small remote sensing targets within the North Channel and South Channel survey areas. Most of these targets appear to have little to no potential historical significance.

Specifically, there were no potentially significant targets identified on the side scan sonar records in either survey area. Several partially buried square crab traps were found in both survey areas. Otherwise, the bay bottom was generally featureless except for the presence of SAV across portions of both areas.

Magnetometer data featured numerous isolated anomalies that were likely generated by single-source objects; suspect crab traps, and other miscellaneous discarded debris. These targets were identified on single lanes confirming the isolated nature of these signatures. These single-source targets were found in both the North Channel and South Channel survey areas and generally featured low- to moderate-intensity but very brief magnetic signatures with limited signature duration. None of these single-source targets are suggestive of potentially significant submerged cultural resources.

However, one magnetic target (**SM1**) identified in the South Channel survey area was distinctive due to the intensity of the signature. Although limited in size/duration, this anomaly generated a dipolar signature that had a maximum intensity of over 2,400 gammas, despite only extending for approximately 20-22 feet. The signature from this target was identified on overlapping and perpendicular lanes that were completed to cover both the South Channel survey area and the small southern extension, near the middle of the South Channel survey area.

This target signature is suggestive of a relatively compact object that has significant and concentrated ferrous mass. While this signature is not typical of known submerged cultural resources, the size of the anomaly indicates the presence of an object with a significant ferrous component (Figure 2). Since the source of the target is buried (no associated sonar signature), the identification of the target source was not possible with remote sensing data. Additional investigations to identify this site or avoidance will likely be recommended at this location.

SM1 Target Information (coordinates are Delaware State Plane, feet):

Location

X 758,667

Y 166,154

38° 27.342286' N

75° 03.524041' W

Characteristics

- Dipole signature with a maximum amplitude of 2,480 gammas; anomaly duration was approximately 20-22 feet.
- No associated sonar signature – indicating the source of this anomaly is buried in bottom sediments

A complete listing of all magnetic and sonar targets will be included in magnetic and side scan sonar target tables in the draft report. Preliminarily, it appears that additional archaeological investigations or avoidance may be recommended at magnetic target **SM1** in the South Channel survey area. No additional investigations or avoidance will be recommended at any of the other targets that were identified within the North Channel and South Channel survey areas.

Work on the draft report is ongoing and will be submitted to Anchor QEA, LLC in December 2021.

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Figure 1. Project Locations and Track Plots

Note: Background Grid = Delaware State Plane Coordinates, feet.



Figure 2. Magnetic Contours (5 Gamma Intervals) at Target SM1

Note: Background Grid = Delaware State Plane Coordinates, feet.